Health Inequality - An Overview on the Health Disparities between Romania and European Union State Members

Zaman, Gheorghe and Hrehorciuc Caragea, Nicoleta

2012

- HEALTH INEQUALITY -
AN OVERVIEW ON THE HEALTH DISPARITIES BETWEEN ROMANIA AND EUROPEAN UNION STATE MEMBERS

Gheorghe Zaman[1]
Nicoleta Hrehorciuc-Caragea[2]

Abstract

Although, currently many people live longer and enjoy the benefit of better health than their previous generations, many countries face an important challenge: large differences among population's health. Thus, health inequality is met everywhere in the world, but more accentuated in countries with a high level of economic development, or those with strong social protection systems. This is an important reason why social policies should be implemented to reduce disparities between disadvantaged groups and the rest of the population. Therefore, in this paper I analyzed the health inequalities between the populations living in Romania in comparison with European Union State Members, focussing my research on three areas of health matters: health status of population, access to health care services and the resource allocation, which population is spending on health care. The empirical analysis conducted in this study reflects the fact that there are health differences in all three directions. Regarding Romania's data, not only the health indicators are unfavourable in comparison, but also those relating to access to health services and aggregate affordability for health expenses of the entire population.

Key words: inequalities, disparities, health, life expectancy, mortality rate
JEL Classification: I14 - Health and Inequality

Abbreviations

EHIS – European Health Interview Survey
EUROSTAT – Official Statistics of European Union
EU – European Union
GDP – Gross Domestic Product
PPS – Purchasing Parity Standard
ILO – International Labour Organization

[1] Senior Researcher, Corresponding Member of Romanian Academy, inst.ec.nat@gmail.com
[2] Lecturer, Ecological University of Bucharest, Vasile Milea Str., No. 1G., Bucharest, Romania, nicolcaragea@gmail.com

NIS – National Institute of Statistics

NMS – New Member States

OECD – Organization of Economic Co-operation and Development

UN – United Nations

WHO - World Health Organization

1. Introduction

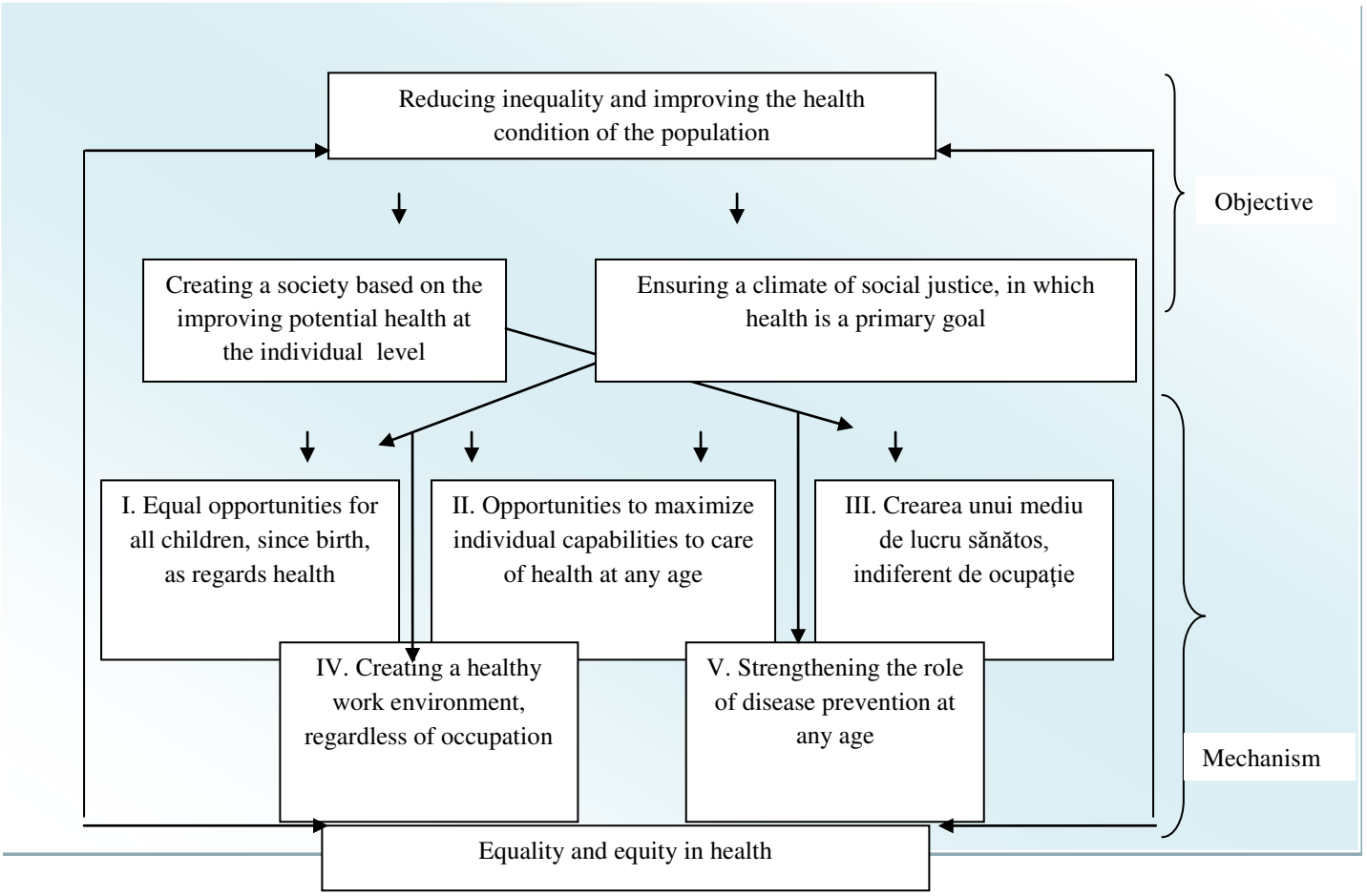
Health is a fundamental right of every individual. But it is known that not all individuals have the same health status, the differences being caused by a variety of socio-economic factors; the most significant being: age, gender, lifestyle, area of residence and living conditions, the level of education, income level, occupation and working conditions, etc.. If these differences are judged in terms of age, health inequality can be easily understood that by nature young individual's health is always better than of older individual's. Thus, inequality is found in various aspects, the most obvious being that, on average, poor population live less than the rich. Moreover, poor people spend the majority part of life in poor health.

Access to health care is also unequal: population with low income, elderly or disabled people and those living in rural areas are most affected. Though in the present individuals live - on average - longer and enjoy better health than previous generations, many countries face an important challenge: large differences in terms of health. Thus, health inequality is met everywhere in the world, including countries with a high level of economic development, or those with strong social protection systems (such as Norway and the Netherlands). World Health Organization estimates that 50% of the differences between rich and poor countries or those in progress of development are due to the health status of their population and due to a higher life expectancy in developed countries group. Estimates also show that a 10% increase in life expectancy of population in a country could lead to an economic growth, on average 0.35% per year. The 2008 WHO Annual Report highlights the deepening inequality and inefficiency of the health care systems worldwide. Even in developed countries, inequality in health is increasing, a phenomenon generated by the provision of specialized medical services, high tech, but less accessible, to the detriment of concern for providing basic health services and disease prevention among all populations. Moreover, inequality may be seen in terms of population status health. Most often, nutrition-related diseases lead to increased risk of illness and reduce life expectancy of the population.

Developed countries face the problem of obesity and a number of associated diseases (hypertension, myocardial infarction, etc.) and the poor countries face the malnutrition.

Health inequality should not be accepted. One of the main reasons why additional social policies should be drafted would be the reduction of disparities between population groups disadvantaged and the rest of the population; the major objective being improving the health of the population throughout the country. Figure 1 presents the main objectives of reducing inequality in health, but also some mechanisms to improve the health of the population.

Figure 1.



Source: authors, by *Strategic Review of Health Inequalities in England - Fair Society, Healty Lives, 2010*

Because health inequalities are not fortuitous, but are heavily influenced by government, communities, and the individual himself, they are not inevitable. Therefore, the improvement of population health and reduction of inequality should be the main core long-term objectives, in terms of social policies at national and international. European Council (June 2008) stressed the importance of eliminating disparities - in terms of population health status - between and among State Members. EU Health Strategy includes measures and actions to reduce the inequalities between people living in different parts of the EU, but also between people of advantaged classes of society and those from disadvantaged groups, by solidarity, social and economic cohesion, the human rights and equal opportunities.

2. Theoretical and methodological approaches

Inequality in health is a situation where not all individuals in a population have the same probability of genetic potential in order to live their healthy lives. Many research studies on this subject (Gakidou, 2002, Groffen, 2008) focuses on measuring the differences in average health levels of two or more groups of people, groups characterized by different levels of income. There are other approaches to the topic, such as the fact that inequality is measured by assessing differences between groups by level of education, occupation, race or ethnicity (Mackenbach, 1997 and Kunst, 1998). Literature in the field of demography (Brockerhoff, 2000) also includes studies on inequality in health, particularly issues regarding the differences between young people (children) of the same age, sex and level of education.

Increased global inequality has resulted in a different direction of research in the field: one that compares the health of the population between the various political entities, such as between countries or regions. Most studies are presented in numerous reports prepared by UN, ILO, OECD and the WHO.

Since 2005, in the European community, a group of experts reviewed the information on policies and practices in public health and supported initiatives to introduce community action programs to reduce existing inequalities. Research Framework Programmes (currently FP7) also provides a major boost to research in this area and share a variety of programs including health program and the Community Programme PROGRESS Social Solidarity labour and employment, financial studies and examples of good practice.

In Romania, there are few research studies on health inequality. The National Institute of Economic Research has included in the annual research programs projects relating to health, living conditions, which were addressed in the context of some aspects of these components of wealth distribution in different population categories, defined by employment status, education, age and sex, household size and type, environment and region of residence, as well as deciles or quintiles. Research on population health status has been conducted in the Institute for Research on Quality of Life and National Institute of Statistics. The economic dimensions of inequality and social polarization in Romania were the main research issues in the social field in the program research of the Institute of National Economy in the frame of Romanian Academy (Molnar, Caragea, 2010).

3. Various methods of measurement for health inequalities

The measurement of health inequality is a first step toward understanding the socioeconomic determinants of health and of health sector inequities. Currently, there are many methods to measure social and economic inequality between population groups, generally, nor particularly inequality in health. Inequality measurement methods are different, but the major problem that always arises in achieving this objective is the health evaluation as a uniform measure, allowing comparisons between two or more population groups. Most of the time, the indicators used are "life expectancy", "household expenditure for health care" and "health care services." The empirical results are based on data from administrative sources and statistical sample household surveys (e.g., Healthy Interview Survey and Household Budget Survey).

The difficulty confronted in obtaining an accurate measure of health for a study of health inequality varies with the type of inequality one is seeking to examine. In this paper health inequalities were measured in three distinct ways:

- Health status inequality between different groups of population;
- Inequality in the access to health care services;
- Inequality in health resources (financial resources, human and material resources of the national health system).

Measuring health inequality is however a very difficult action because the complexity of the health various determinants. Therefore, any result obtained from the evaluation of differences

between different individuals, between social groups, communities or societies, in terms of health, should be viewed with some reservations.

In the following section of the paper there are underlined some of the most representative methods measuring inequality in health:

(1) One of the methods measuring inequality of health in the vision of a research team from the World Health Organization (Mäkinen, 2000), examines the inequality of states in developing or in transition, in terms of resource allocation in health sector. Differences between countries were judged on the following indicators: public spending on health care per capita, number of ancillary medical personnel (nurses) and the number of doctors per 100,000 inhabitants.

(2) A recent health inequality measurement method (Doorslaer and O'Donnell, 2008) is based on the computation of the composite index accounting the cumulative action of determinants of health. The value of this approach is that the index is based on analysis of level and trends of health inequalities and the method can also explain the causes of inequality in health. Concentration index is calculated as the aggregate amount of the contribution of health determinants (demographic, social and economic factors). Wagstaff et al. (2003) demonstrate that the concentration index of health can be written as the sum of the contribution of factors, such as demographics, education, region, etc., to income-related health inequality, where each contribution is the product of the elasticity of health with respect to the factor and the concentration index of the factor. That is, the concentration index can be written as:

$$C = \sum_k (\beta_k \bar{x}_k / \mu) C_k + GC_\varepsilon / \mu \qquad (1)$$

where: μ - is the mean of the health measure y , $\bar{x}_k$ - is the mean of kth factor , β_k – is its coefficient from least squares regression of health on all factors, C_k - s the concentration index for the kth factor and GC_ε - is the generalized concentration index for the error term of the regression:

$$y = \alpha + \sum_k \beta_k x_k + \varepsilon \qquad (2)$$

(3) Measuring health status inequality is based on the life expectancy distribution, by age. This approach seeks to answer several questions, for example, "it may be perfect equality between individuals when the same number of years they live," or when they enjoy the same level of health status? ".

In the next section, it is described the method for measuring health inequalities for a population with individuals born in T. We want to see if, at time T + t there are differences in terms of their health status. In other words, individuals who compose the population have the same level of health when they reached the age of t? In circumstances where there is perfect equality, we make the two conditions are necessary and sufficient:

- All individuals have the same healthy life expectancy;
- All individuals are subject to the same risks in terms of health status (incidence of illness and likelihood of improvement is considered equal for all individuals).

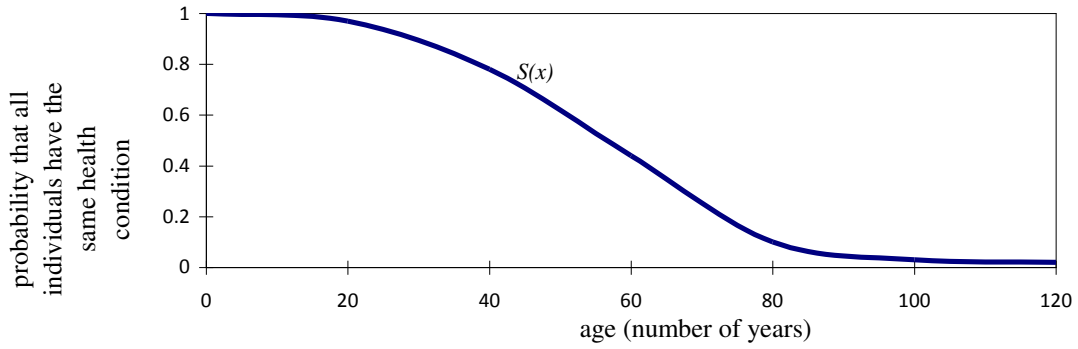
Healthy life expectancy is a function that can be written as:

$$S(x) = p(x) \cdot \sum_{j} p_{jx} \cdot w_{jx} \qquad (3)$$

where: $S(x)$ - is the healthy life expectancy at age x, $p(x)$ - is the probability of being alive at age x, $p_{jx}(x)$ - probability to have health status level j at age x and $w_{jx}(x)$ - is the severity of disease at age x, attributed to the health status level j (severity is measured on a scale where 0 corresponds to death and 1 is equivalent to full health).

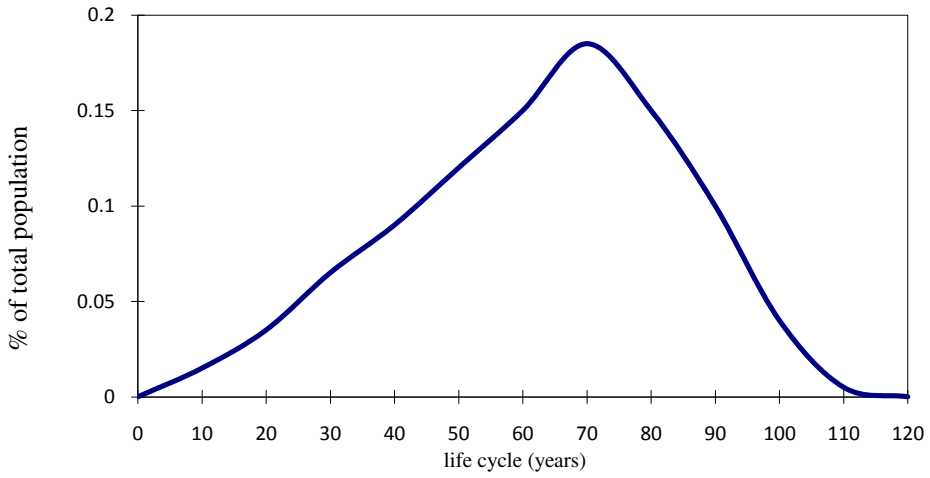
Figure 2a illustrates the healthy life expectancy by age and Figure 2b represents the distribution of healthy life expectancy for a population subject to the same risks in terms of health.

Figure 2a.



In Figure 2a, healthy life expectancy - equal for all individuals - is given by the area under the curve *S(x)*.

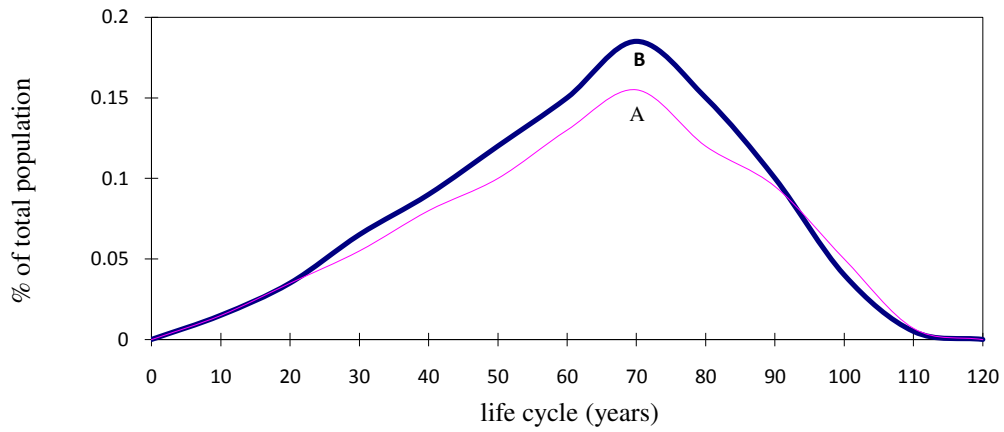
Figure 2b.



Each of the individual has the same healthy life expectancy, but do not have equal chances to maintain its good health throughout life. For example, at age 20 years old, the probability of having a good health is 93%. In other words, at this age, because of natural causes (the misfortune), 7 of 100 individuals have a state of full health. Inequality in health should be analyzed, but in terms of risk factors that can damage the health of individuals. For example, if some individuals of the population are subject to risks related to socio-economic conditions in which they live, what is the likelihood that they will have good health for 20 years? Or, on an equal risk, varies as the probability of having a good health according to age?

Consider two populations A and B, characterized by different risk profiles in terms of maintaining good health of individuals who compose them, throughout life. In Figure 3 we can see that there are differences in the likelihood that individuals who constitute the population has to have the same healthy life expectancy compared to the population component B, due to risk factors that can not be avoided.

Figure 3.



(4) Other method used to measure inequality in health has to calculate an index of inequality, according to the relation:

$$I(\alpha,\beta)=\frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i-y_j\right|^{\alpha}}{2n^2\mu^{\beta}} \qquad (4)$$

where:

y_i, y_j - is the health status of individual *i*, respectively *j*, μ - is the mean of population and *n* – is the number of population. α and β are parameters, which may have the following values: α =1 and β =0 or β =1, respectively α =2 and β =0 or β =1.

By replacing the parameter values α and β, following formulas are obtained:

$$I(\alpha=1,\beta=0)=\frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i-y_j\right|}{2n^2} \qquad (5a)$$

$$I(\alpha=1,\beta=1)=\frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i-y_j\right|}{2n^2\mu} \qquad (5b)$$

$$I(\alpha=2,\beta=0)=\frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i-y_j\right|^{2}}{2n^2} \qquad (5c)$$

$$I(\alpha = 2, \beta = 1) = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i - y_j\right|^2}{2n^2\mu} \qquad (5d)$$

If $\alpha = 1$, $\beta = 1$, than $I(\alpha, \beta)$ is Gini coefficient often used to measure income distribution inequality.

4. Analysis of health disparities among EU State Members

Analysis of heath inequality between different countries can be achieved by comparing the recorded values of certain indicators able to reflect the population's health status, and access to health care and financial, material and human resources in health sector. In the next section of the paper I propose an empirical analysis of inequality in health in the EU State Members of the

(1) perceived heath status
(2) life expectancy
(3) mortality rate
(4) share of health care expenditures in total household spending
(5) number of people who visit a physician or a surgeon in the last 12 months[3]
(6) total heath expenditure per capita
(7) number of physicians per 100000 inhabitants.

The first three indicators create a picture of the disparities between EU State Members as it regards the health status of their population. Share of health care expenditures in total household spending and the number of people who visit a physician or a surgeon in the last 12 months reflects the access of population to health care services. Comparisons of values for the last two indicators proposed for the analysis of inequality provides information on inequality in the allocation of resources in national health systems.

4.1 Health status disparities

Most of recent studies on health inequality between two or more population groups are based on the analysis of differences between average levels of health status by certain characteristics (e.g. income, ethnicity or race, education, employment status, etc.). The health of a population can be quantified by assessing each individual's perception that consists of their own health status or by

[3] According to EHIS.

such indicators as life expectancy at birth, infant mortality, chronic disease mortality, morbidity by types of diseases, etc.

Perceived health status of population

Analysis data was provided by national health interview surveys (according to European Health Interview Survey methodology), conducted in all Member States in 2008 (Box 1).

Box 1.

The overall objective of this statistical research has been developing, implementing and achieving population health interview survey on a statistical sample of households to provide information and to describe the health status of the population that are not available from other data sources. In Romania, the investigation was prepared in accordance with the European methodology (European Health Interview Survey), the results being representative at national and regional level.

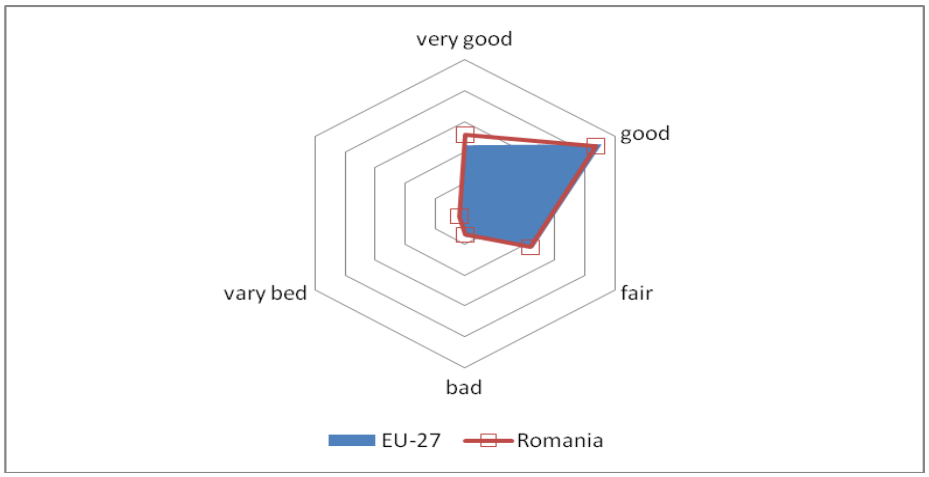
Perceived health status - is the subjective assessment of the individual's declared health status.

According to EU survey methodology concepts and definitions for the health status of the population, the indicator was calculated based on the choices of answer to the question: "In general, how would you assess your health?" Very good, good, satisfactory, bad or very bad For children, health status has been assessed by a parent.

Source: The health status of the population in Romania, NIS, 2008

On average, there are relatively small differences between the EU and Romania, in terms of population structure, in terms of the perceived health condition: very good, good, satisfactory, poor, very poor (Figures 4 a, b). Most people believe that their health is good (45.5% in the EU, respectively 43.7% in Romania).

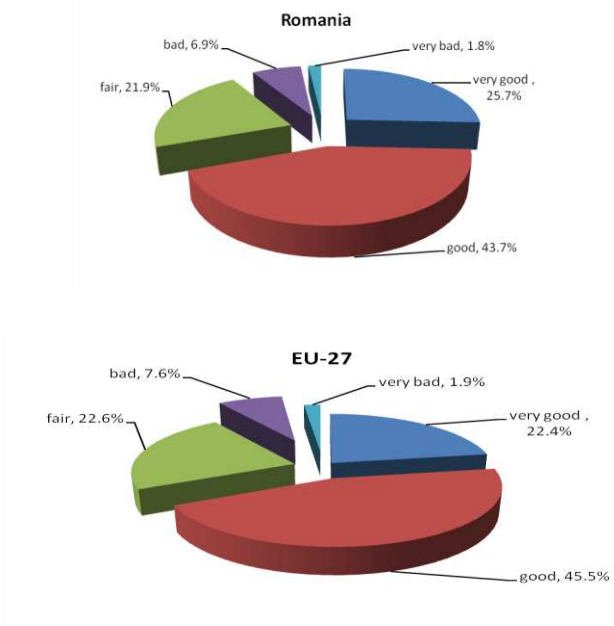
Figure 4a.



Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/heah/public_health/database

People who think that they have a very good health are more prevalent in Romania (25.7%) compared with the EU average (22.4%). The people who said they had a very poor health in Romania are 1.8%, very close to the value calculated for the EU-27, 1.9%.

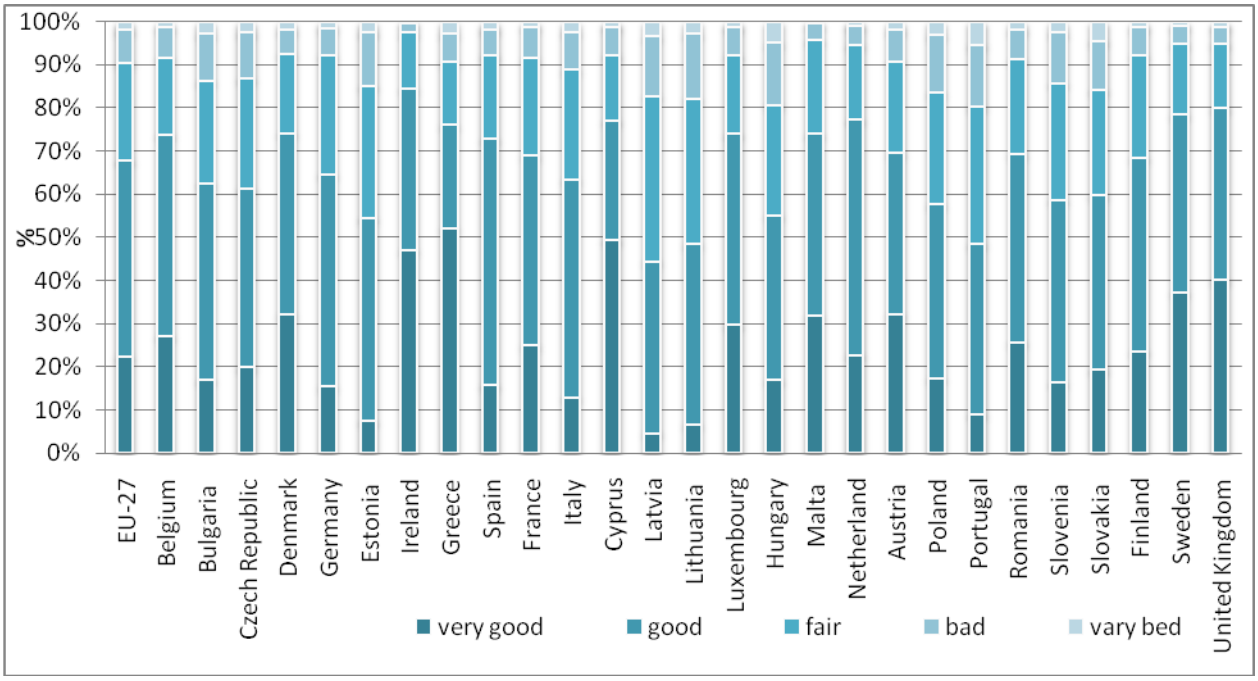
Figure 4b.



Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/heah/public_health/database

In the next section it is compared the perceived health status of population (according to data from Annex Table 1A), registered in the 27 EU State Members (Figure 5).

Figure 5.



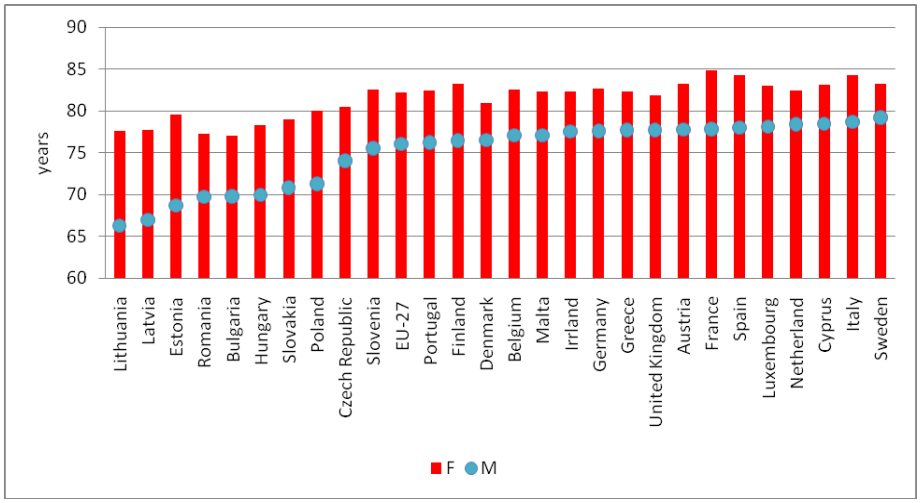
Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/heah/public_health/database

Among European countries there are large variations in the structure of the population by health condition perceived of population. The highest weights of the population with good health status are observed in the Mediterranean countries (Greece and Cyprus 52.2%, 49.5%). On the opposite side are Portugal and Hungary, countries where the percentage of population with a very poor state of health is very high (5.3% and 4.9%). Also, the Baltic Countries are characterized by low values of the rate of people with good health (Latvia, 4.7%, Lithuania and Estonia 6.7%, 7.4%).

Life expectancy

Disparities between Member States of the EU-27 - in terms of life expectancy at birth - are very high (7.8 years for the female population, i.e. 12.9 years for male population in 2008). Causes of these differences involve a wide range of factors, from the biological and behavioural socio-economic ones. The lowest life expectancy – for males - is 66.3 years in Lithuania, and the highest is recorded in Sweden (79.2 years). For women, the lowest life expectancy at birth has Bulgaria (77.1 years) and the upper, France (84.9 years).

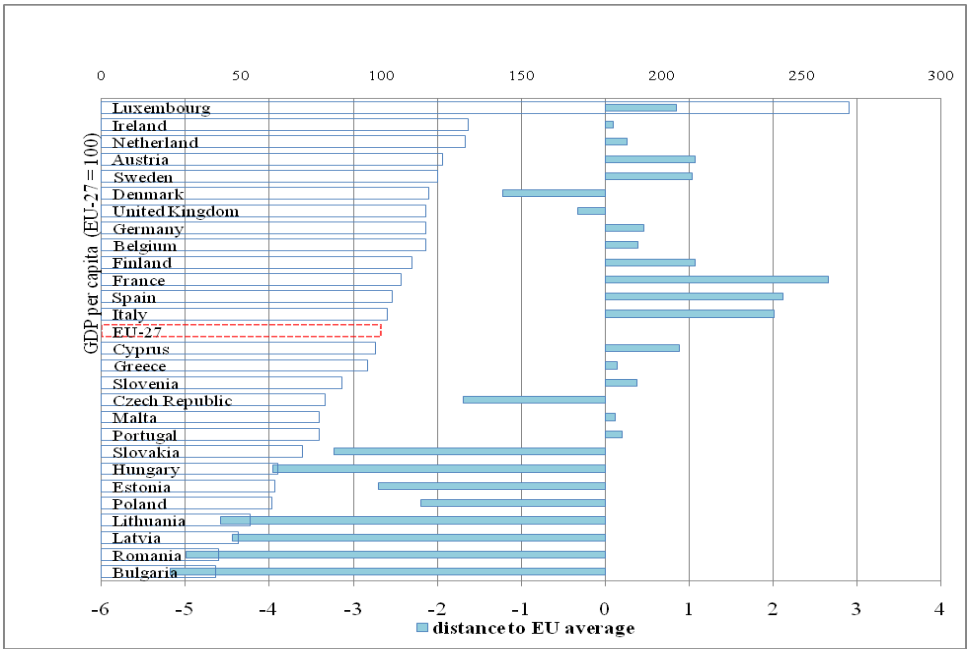
Figure 6.



Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/main_tables

Life expectancy is greatly influenced by infant mortality, very high in countries with low economic development. Also, these countries are characterized by the highest life expectancy spreads to the EU average (e.g., the Baltic Countries: Lithuania and Latvia, but also the latest EU State Members: Bulgaria and Romania). On the opposite side are the rich countries, where values are above the European average (Figure 7).

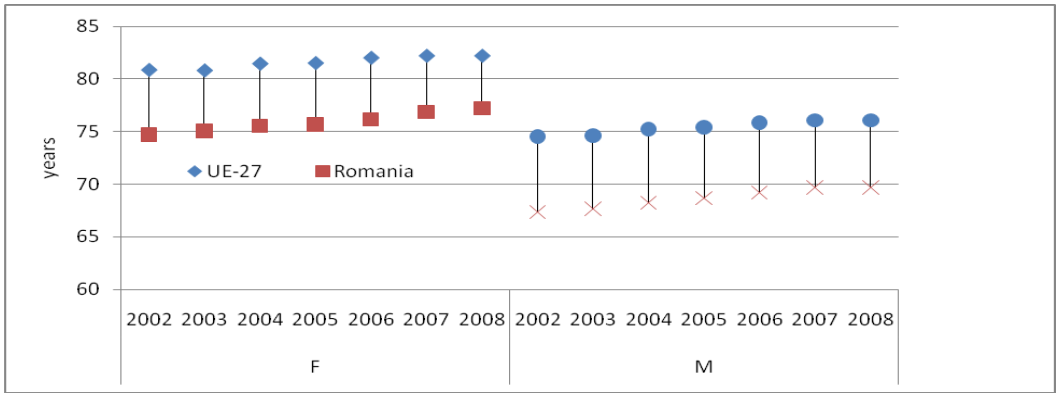
Figure 7.



Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/main_tables

Although life expectancy in recent years has been an increasing trend for people of both sexes, is a still large difference between Romania and EU average (Figure 8).

Figure 8.

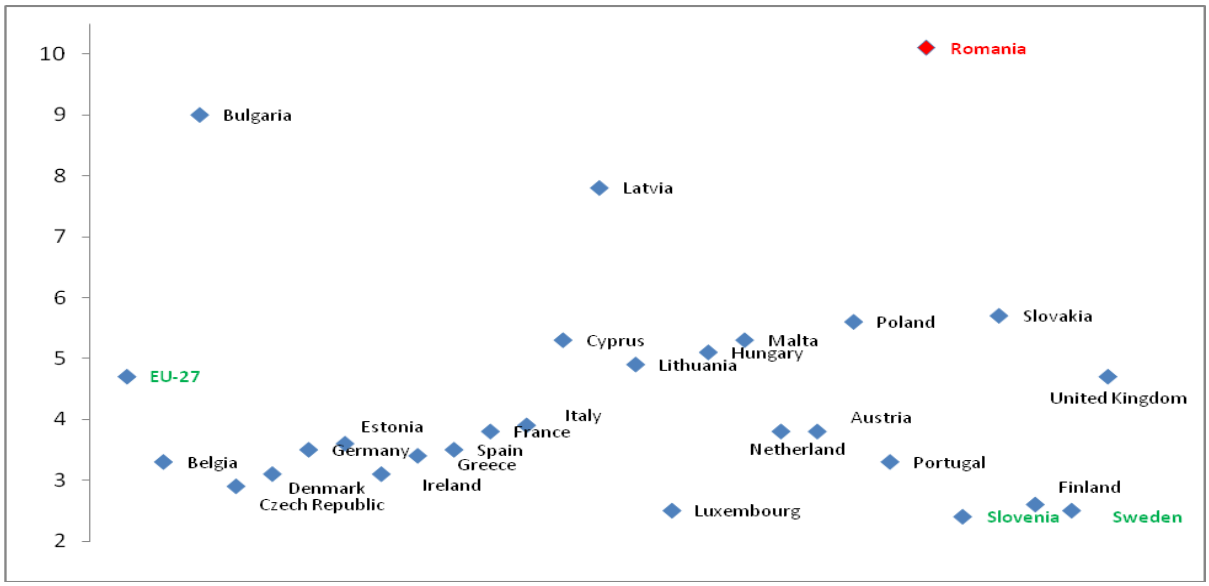


Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/main_tables

Mortality rate

Mortality, in general, infant mortality and chronic diseases caused by, in particular, provides relevant information on the health condition of the population. Most often, values significantly different mortality rates recorded in different countries is due to their economic development, and social policies applied in the respective states.

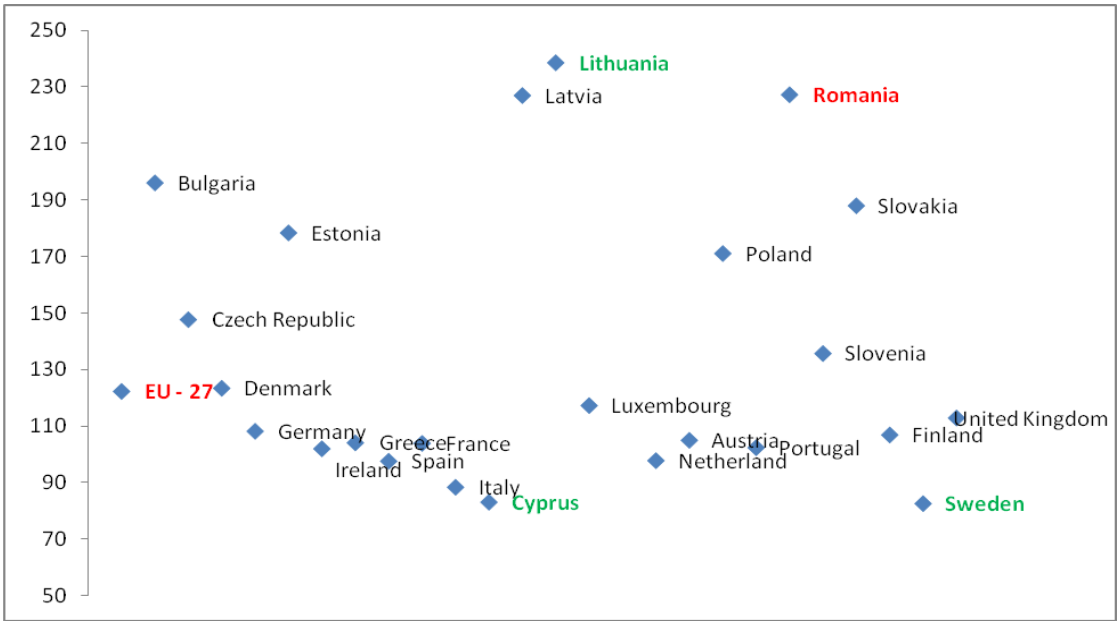
Figure 9.



Source:http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdph210&plugin=1

Among EU Member States, Romania is the country with the highest infant mortality rate (10.1 per 1000 live births in 2009), followed by Bulgaria (9.0) and Latvia (7.8), the European Union average was 4.7 cases per 1000 live births. The rate of mortality caused by chronic diseases is very high in our country (227.4 to 100,000 people) than the EU average (122.4).

Figure 10.



Source:http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdph210&plugin=1

The largest deviation of mortality rates is between Lithuania and Sweden: 156 cases per 100,000 persons. A totally different situation occurs in Sweden, a country where mortality rates recorded the lowest values (2.5 cases of death per 1000 live births, respectively 82.7 cases of deaths per 100,000 inhabitants suffering by chronic diseases).

4.2 Inequality of resources allocation in health systems

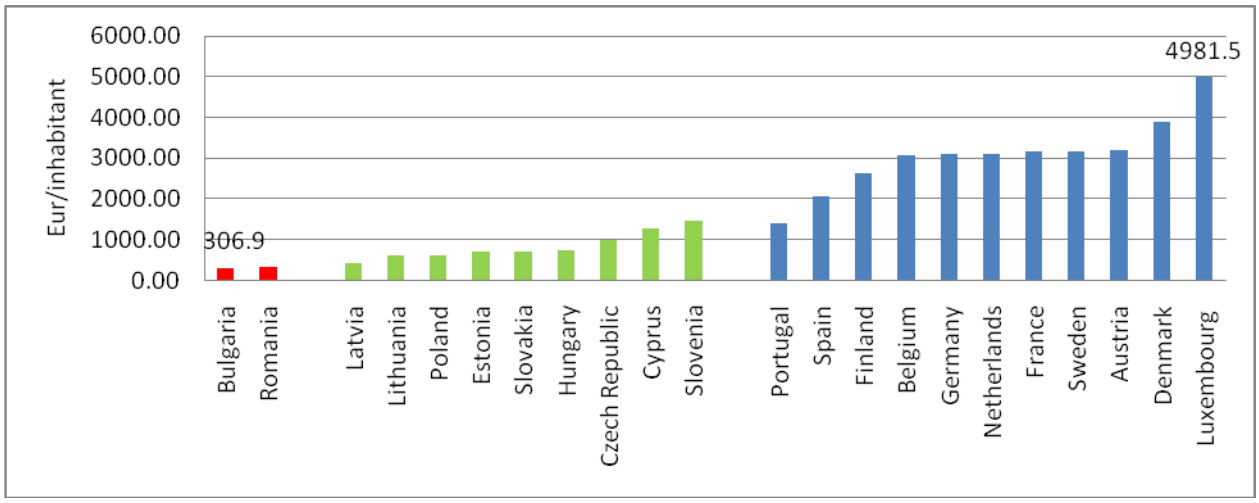
The next section of the paper is focalized on the analysis of inequality in health, stemming from the large gaps that exist between Member States regarding the financing of national health systems and human resources. To this end, we compare health care expenditures in the EU State Members and the number of doctors per 100,000 inhabitant's ratio.

Health care expenditures per capita

Economic disparities between EU countries are also reflected in health, through the financing of health systems. Also, funding mechanisms are different from one country to another, especially by specific social protection systems. An indicator that includes all sources of financing health care, developed the methodology of the System of Health Accounts - EUROSTAT / OECD / WHO, is the total health care spending established by aggregating the national expenditure from all public or private funding sources (governmental budgets, the budgets of health insurance funds, health expenditure of private non-profit organizations, and household expenditure for health care).

Among EU State Members there are great differences in the level of health care costs, coupled with economic development. For example, in 2008, total health care expenditure, per capita, have a value of more than 16 times higher in Luxembourg than in Bulgaria (Figure 11).

Figure 11.



Source:

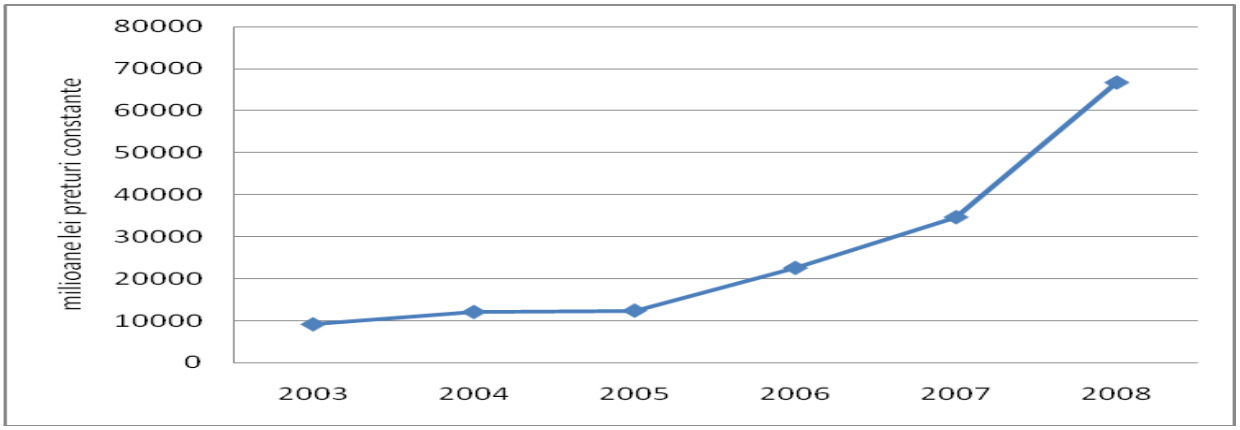
http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/data_public_health/database

Also, significant variations in spending on health care per capita, there are between three blocks of countries, based grouping by the time their integration into European structures. Most of financial resources are allocated to health care by the older EU State Members. Also, we can see between them significant amounts of health care expenditure in the Nordic Countries (Denmark,

Sweden, Netherlands), characterized by strong social protection systems, including health protection.

In Romania, the financing of the health system continues to be used in an inappropriate and inefficient. Despite an increase in total health expenditure during the last decade, the financing of the health system in Romania remains low in a European context, especially taking into account the long period of chronic underfunding and lack of investment in health.

Figure 12.



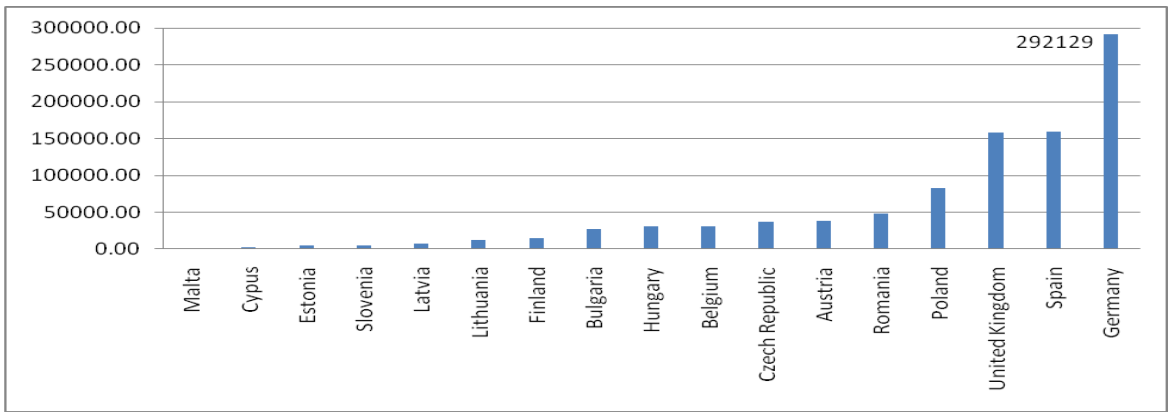
Source: The System of Health Accounts, NIS, 2009

In Romania, in addition to under-funding of national health system it is inefficient and inequitable; there still are an arbitrary use of resources, unequal allocation of resources among different regions, or between different types of health services providers. For example, the health care services provided in health hospitals from urban areas are better, especially from large cities.

Physicians per 100000 inhabitants

The differences between countries in terms of providing medical services of highly qualified personnel are huge. In this regard, the inequality in the allocation of human resources does not have its origins in the economic development of countries, but their demographic capacity in the sense that countries with large populations have a large number of doctors. Therefore, Germany is the country that provides qualified medical assistance to population by the highest number of doctors (about 3 doctors per 10 inhabitants). Malta is to the opposed site, with a doctor to 100 people.

Figure 13.



Source:

http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/data_public_health/database

4.3 Access inequality to health care services

Beyond the problems of financing health systems and providing them with highly qualified medical personnel, public access to public health services is also uneven. A large number of people, although they are insured, have limited access to health care amid a very low household budget allocated for health maintenance. Poor families can not afford co-pay medical services and medicines required and, sometimes, "extra pay for doctors and auxiliary medical personnel. There are also disparities among population groups, caused by geographical location or area of residence, factors unfavourable access to health services for people living in isolated rural areas or are located far away from clinics or hospitals.

In Romania, the national health system remains responsible for major health problems of inefficient population, the current model and focusing mainly on curative care in the hospital, to the detriment of the ambulatory and primary care. With nearly half the population living in rural areas where functional hospitals are virtually inexistent, this leads to major problems of accessibility to specialized health services.

Also, differences in access to medical services can be seen in terms of uneven quality of health services of the same type, but this topic will be the subject of future research.

Next, the study covers the inequality and access to care by two indicators: the first (household expenditure for health care) reflect the population's access to medical services by the public costs

for health care, and the second (population in urban/rural areas which turned to a doctor), creates a picture of the limits imposed by the residence of access to medical services.

Share of health expenditure in the total spending of households

Because the data for the EU State Members are not available, we will analyze the differences between households in Romania, grouped by employment status of household head. The data underlying the calculation of this indicator are provided by the Household Budget Survey (reference year 2008).

Figure 14.

Source*: Statistical Yearly Book*, NIS, 2009

In our country, population's health spending in 2008 was on average, 4.1%, 1.4 percentage points more than in 2001. Although healthcare spending growth would (naturally) the idea of population health deterioration for economically weaker states, the phenomenon is positive, reflecting increasing public access to health services. However, differences between population groups, caused, on the one hand, household income levels, in close correlation with the employment status of household head, and on the other hand, age. The latter assertion is supported by the fact that the households of pensioners, but have a lower level of income, health care spending more than households of employees, farmers or unemployed (Figure 14).

Pesrsons who visited a specialist during last 12 months before the interview[4]

The indicator was chosen for the analysis of population's access to medical services provided by qualified medical personnel, areas of residence. Although there are isolated in rural areas where there are no clinics that provide primary health care population, or if they exist, have no permanent doctors and have rudimentary equipment, real health care needs of rural population to

[4] With reference to the 12 months preceding the interview (May 15-June 6, 2008)

determine go to the closest cities to receive specialized advice. It is also one of the reasons why data from health interview survey does not show large differences by area of residence (17.6% of the total urban population has consulted the physician or surgeon in the last 12 months, unlike 12.5% in rural areas). It is, therefore, the worse public health, or we can say that access to specialized medical services for people living in rural areas is more limited? Although they need a specialist consultation, there are still people, regardless of the residence where they live, doing not call the doctor. Data provided by Health Interview Survey shows that, in the reference period, 7.4% of people who lived in rural areas had at least need to consult a physician or surgeon, but they did, while in rural areas the percentage is lower (5.6%). However, on average, there are differences - the average residence - in the frequency with which people consulted a doctor (e.g.: 2.3 visits in urban areas, 2.0 visits respectively in rural areas).

5. Aggregate Concentration Index

Why are there inequalities between countries in terms of population's health? How can we measure the magnitude of these differences? Assuming that there is a concentration of a phenomenon is a form of inequality, based on the model proposed by Doorslaer, I will compute an aggregate concentration index using data on population with perceived *good health* and *very good*.

The index includes the influence of several factors on health[5] as followings:

a. GDP per capita;
b. Healthy life years, defined as the number of years that a person is expected to continue to live in a healthy condition;
c. Health care expenditure per capita[6].

Indice agregat al concentrării se determină după formula:

$$C = \sum_k (\beta_k \bar{x}_k / \mu) C_k + GC_\varepsilon / \mu .$$

[5] Factors were considered by the author as having a significant impact on the health of the population, indicating that was the basis of the inequality between EU countries.

[6] According to HP_SHA (cost health service providers, registered under the methodology of Eurostat/OECD /WHO System of Health Accounts).

Where is μ the mean of dependent variable y (67, 9% of EU population declared that they have a good and very good health). Regression coefficient (β_k) are calculated on the base of data presented in table 1.

$\bar{x}_k$ – mean of k factors (they are mentioned at points a, b, c).

C_k – Gini coefficients measuring the inequality of factors x_k , GC_ε – Gini coefficient of residuals.

Table 1

EU Member States (ascending ordered by GDP per capita)	*Y(1)* Good and very good (%)	*Y(2)* Bad and very bad (%)	x_1 GDP per capita (pps, UE-27 = 100)	x_2 Healthy life years	x_3 Health expenditure per inhabitant (euro)
Bulgaria	62.6	13.7	41	65.5	232.3
Romania	69.4	8.7	42	62.6	353.4
Latvia	44.5	17.2	49	54.1	474.4
Lithuania	48.4	17.7	53	59.3	634
Poland	57.7	16.4	61	62.6	666.7
Estonia	54.6	14.8	62	57.2	733.6
Hungary	55.2	19.2	63	58.0	765.3
Slovakia	59.8	15.7	72	52.3	606.5
Malta	74.0	4.3	78	71.9	1455
Portugal	48.6	19.6	78	57.2	1458.5
Czech Republic	61.5	13.1	80	63.3	832.5
Slovenia	58.8	14.2	86	60.9	1530.2
Greece	76.1	9.3	95	65.8	1478
Cyprus	77.1	7.7	98	65.1	1268
Italy	63.6	11.1	102	61.9	2686
Spain	72.9	7.8	104	63.2	2142.7
France	69.0	8.4	107	64.2	3266
Finland	68.6	7.7	111	59.4	2780.7
Belgium	73.9	8.2	116	63.7	3202.7
Germany	64.7	7.8	116	57.4	3205.7
United Kingdom	80.0	5.1	116	66.1	2992
Denmark	74.3	7.3	117	60.7	4049.5
Sweden	78.5	5.1	120	68.7	3342
Austria	69.6	9.1	122	59.5	3544.4
Netherland	77.4	5.3	130	59.8	3370.9
Ireland	84.4	2.5	131	65.0	2939.9
Luxembourg	74.0	7.7	267	64.2	4162

Source: *Eurostat*

http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/database

Table 2

	β_k good and very good self perceived health	β_k bad and very bad self perceived health	x_k	C_k	GC_ε	μ sharing of population with good and very good self perceived health	μ sharing of population with bad and very bad self perceived health
GDP/capita (pps)	0.01237	0.010693	100	0.104	0.025	67.9	9.5
Healthy life years	1.345657	-0.56557	61.8	0.011			
Health expenditure per inhabitant (euro)	0.003851	-0.00248	2006.4	0.540			

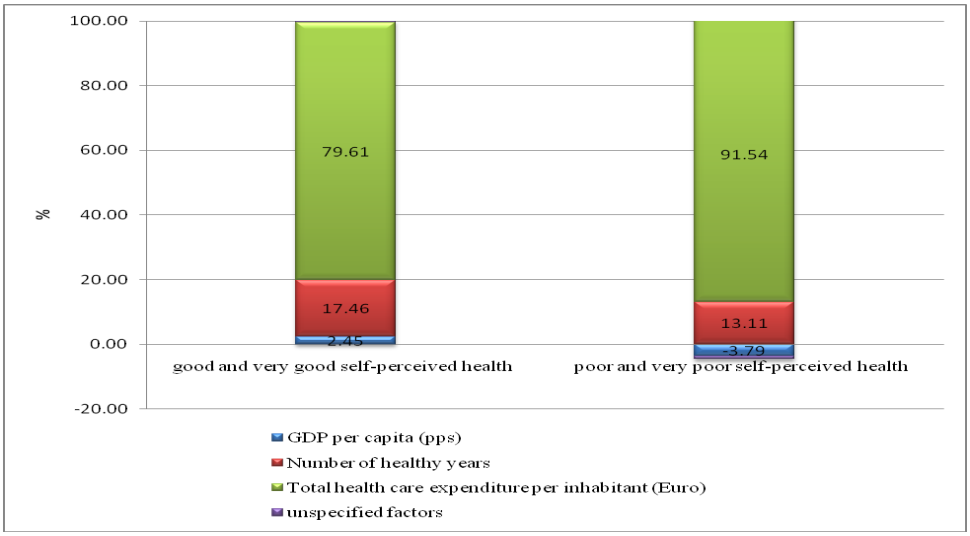
Source: own calculation on the base of Eurostat data, 2010

After calculations, the merger results in an aggregate index, calculated on the basis of people's perceptions of health. The index has a value of 0.077 when considering the concentration of the population who declared a state of good and very good health; the index value is -0.308 if it is envisaged merger of the population who declared a state of poor and very poor health. Therefore, there can be no inequality between EU State Members as regards good and very good health.

In absolute terms, the second aggregate index shows inequality between EU State Members; due to differences between the number of people who perceive their health as poor and very poor.

It is noted (Figure 15) that inequality is largely determined by the level of health spending per capita, an indicator which recorded the greatest variation between the values.

Figure 15



Source: own calculation on the base of Eurostat data, 2010

An important factor in the composition of aggregate concentration index is the healthy life expectancy (17.5% and 13.1%). The level of economic development of the EU State Members, as measured by GDP per capita, affects the least inequality between Member States, regardless of people's perceptions of health.

Conclusions

Since the twenty-first century, inequality in health has become a constant concern of the social policies of the European community. Empirical studies show that the incidence and prevalence of most diseases is higher in poorer countries, but also in developed countries among people with low education and / or low income, their life expectancy is significantly less. Concerns about reducing inequalities between different socio-economic groups have led to the development of various methods of measurement. In terms of measuring inequality in health, the major problem is to choose the most relevant indicators to reflect the differences between two or more population groups. In this sense, the inequality in health can be addressed on three of the hottest (1) the health of the population, (2) the allocation of financial, material and human resources in the health sector, and (3) people's access to care services health. The empirical analysis conducted in this study reflects the fact that there are differences between EU State Members in all three directions. Regarding Romania’s statistical data, not only comparisons with regard to health indicators are unfavourable, but also those relating to access to health services and total health spending. In Romania, life expectancy, although is growing, is one of the lowest values in the European Union. Indicator value is the most influenced by infant mortality that is still very high, due to weak and under funded national health system.

References

1. Brockerhoff, M., Hewett P.: Inequality of child mortality among ethnic groups in sub-Saharan Africa, Bulletin of the World Health Organization, 78:30-41 (2000)
2. Doorslaer, E., O'Donnell, O.: Measurement and Explanation of Inequality in Health and Health Care in Low-Income Settings, World Institute for Development Economics Research, Discussion Paper No. 04 (2008)
3. Gakidou EE, King G.: Measuring total health inequality: Adding individual variation to group-level differences. *International Journal for Equity in Health*, 1(3) (2002)
4. Gakidou EE, Murray, C.J.L.: Defining and measuring health inequality: an approach based on the distribution of health expectancy, *Bulletin of the World Health Organization*, 78(1):42-55 (2000)
5. Groffen, D. A. I., Bosma, H., van den Akker, M., Kempen, G. I. J. M., van Eijk, J. Th. M.: Material deprivation and health-related dysfunction in older Dutch people: findings from the SMILE study. *Eur J Public Health* 18: 258-263 (2008)
6. Kunst, A.E., Groenhof, F., Mackenbach, J.P., Health E.W.: Occupational class and cause specific mortality in middle aged men in 11 European countries: comparison of population based studies. EU Working Group on Socioeconomic Inequalities in Health, BMJ, 316:1636-1642 (1998)
7. Mackenbach, J.P., Kunst, and A.E.: Measuring the magnitude of socioeconomic inequalities in health: an overview of available measures illustrated with two examples from Europe. Soc Sci Med, 44:757-771 (1997)
8. Makinen, M., Waters, H., Rauch, M., Almagambetova, N., Bitran, R., Gilson, and L.: Inequalities in health care use and expenditures: empirical data from eight developing countries and countries in transition. *Bulletin of the World Health Organization*, 78(1):55-65 (2000)
9. Makinen, M., Waters, H.: Inequalities in health care use and expenditure: empirical data for eight developing countries and countries in transition, Bulletin of World Health Organizations, 78(1) (2000)
10. Molnar, M., Caragea, N.: Economic Dimensions of Inequality and Social Polarization in Romania, Programul Fundamental al Academiei Române (2010)

11. Shanmuganathan, S., Claster, W.: Statistical methods in analyzing health inequalities among the world citizens, 18th World IMACS / MODSIM Congress, Australia (2009)
12. National Institute of Statistics: Health status of Romanian population. (INS, Bucharest 2008)
13. National Institute of Statistics: A System of Health Accounts. (INS, Bucharest 2009)
14. Strategic Review of Health Inequalities in England - Fair Society, Healty Lives, Published by The Marmot Review (2010)
15. The economic benefits of reducing health inequalities in England www.ucl.ac.uk/gheg/marmotreview/Documents
16. Frontier Economics Overall costs of health inequalities. (2009) www.ucl.ac.uk/gheg/marmotreview/Documents
17. Commission on Social Determinants of Health CSDH Final Report: Closing the gap in a generation: Health equity through action on the social determinants of health. Geneva: World Health Organization http://ec.europa.eu/health/ph_determinants/socio_economics/documents/com2009_en.pdf
18. Health White Paper: 'Saving Lives: Our Healthier Nation', (1999) http://tinyurl.com/dmycvx
19. World Health Organisation. Maximising positive synergies between health systems and Health initiatives. Switzerland, (2008) www.who.int/healthsystems

Annexes

Table 1A.

	Very good	Good	Fair	Bad	Very bad
EU-27	22.4	45.5	22.6	7.6	1.9
Belgium	27.2	46.7	17.9	6.9	1.3
Bulgaria	17.0	45.6	23.7	10.9	2.8
Czech Republic	19.9	41.6	25.5	10.6	2.5
Denmark	32.2	42.1	18.5	5.4	1.9
Germany	15.5	49.2	27.5	6.4	1.4
Estonia	7.4	47.2	30.6	12.4	2.4
Ireland	47.1	37.3	12.9	2.2	0.3
Greece	52.2	23.9	14.6	6.6	2.7
Spain	15.8	57.1	19.3	6.1	1.7
France	25.0	44.0	22.6	7.3	1.1
Italy	12.9	50.7	25.4	8.8	2.3
Cyprus	49.5	27.6	15.2	6.6	1.1
Latvia	4.7	39.8	38.2	13.8	3.4
Lithuania	6.7	41.7	33.8	14.9	2.8
Luxembourg	29.7	44.3	18.3	6.5	1.2
Hungary	16.9	38.3	25.6	14.3	4.9
Malta	31.9	42.1	21.7	3.9	0.4
Netherland	22.8	54.6	17.4	4.4	0.9
Austria	32.3	37.3	21.3	7.2	1.9
Poland	17.4	40.3	25.9	13.4	3.0
Portugal	9.1	39.5	31.9	14.3	5.3
Romania	25.7	43.7	21.9	6.9	1.8
Slovenia	16.4	42.4	27.0	11.7	2.5
Slovakia	19.5	40.3	24.5	11.3	4.4
Finland	23.7	44.9	23.7	6.4	1.3
Sweden	37.3	41.2	16.4	4.1	1.0
United Kingdom	40.2	39.8	14.9	4.0	1.1

Source: Eurostat, European health interview survey

http://epp.eurostat.ec.europa.eu/portal/page/portal/heah/public_health/database

Table legends

Figure legends